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A-Z Index: A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

Search OSHA

[Technical Links](#) > [Health Guidelines](#) > [Naphtha \(Coal Tar\)](#)

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330967

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OCCUPATIONAL SAFETY AND HEALTH GUIDELINE FOR NAPHTHA (COAL TAR)

INTRODUCTION

This guideline summarizes pertinent information about coal tar naphtha for workers and employers as well as for physicians, industrial hygienists, and other occupational safety and health professionals who may need such information to conduct effective occupational safety and health programs. Recommendations may be superseded by new developments in these fields; readers are therefore advised to regard these recommendations as general guidelines and to determine whether new information is available.

SUBSTANCE IDENTIFICATION

* Formula

Varies.

* Structure

(For Structure, see paper copy)

* Synonyms

Crude solvent coal tar naphtha, high solvent naphtha, naphtha, benzin B70, petroleum benzin, coal tar naphtha distillate

* Identifiers

1. CAS No.: 8030-30-6
2. RTECS No.: DE3030000
3. DOT UN: 2553 27
4. DOT label: Flammable liquid

* Appearance and odor

Coal tar naphtha is a colorless or reddish to brown colored, mobile liquid with an aromatic odor. It is a mixture of comprised of varying percentages of aromatic hydrocarbons including toluene, xylene, benzene, and cumene. The benzene content is higher in the coal tar naphthas with low boiling points.

CHEMICAL AND PHYSICAL PROPERTIES*** Physical data**

1. Molecular weight: 110 (approximately)
2. Boiling point (at 760 mm Hg): 150 to 220 degrees C (302 to 428 degrees F) (approximately)
3. Specific gravity (water = 1): 0.86 to 0.89
4. Vapor density: Data not available.
5. Melting/Freezing point: Data not available.
6. Vapor pressure at 20 degrees C (68 degrees F): Less than 5 mm Hg
7. Solubility: Insoluble in water; miscible in absolute alcohol, benzene, toluene, chloroform, carbon disulfide, carbon tetrachloride oils (except castor oil), and xylene.
8. Evaporation rate: Data not available.

*** Reactivity**

1. Conditions contributing to instability: Heat, sparks, open flames, and other sources of ignition.
2. Incompatibilities: Contact between coal tar naphtha and strong oxidizers such as chlorine and chlorine dioxide should be avoided.
3. Hazardous decomposition products: None reported.
4. Special precautions: None reported.

*** Flammability**

The National Fire Protection Association has assigned a flammability rating of 2 (moderate fire hazard) to coal tar naphtha.

1. Flash point: 37.8 to 42.8 degrees C (100 to 109 degrees F) (closed cup)
2. Autoignition temperature: 277 degrees C (531 degrees F)
3. Flammable limits in air: Data not available.
4. Extinguishant: For small fires use dry chemical, carbon dioxide, water spray, or regular foam. Use water spray, fog, or regular foam to fight large fires involving coal tar naphtha.

Fires involving coal tar naphtha should be fought upwind from the maximum distance possible. Keep unnecessary people away; isolate the hazard area and deny entry. Isolate the area for 1/2 mile in all directions if a tank, rail car, or tank truck is involved in the fire. For a massive fire in a cargo area, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from the area and let the fire burn. Emergency personnel should stay out of low areas and ventilate closed spaces before entering. Vapors may travel to a source of ignition and flash back. Vapors are an explosion and poison hazard indoors, outdoors, or in sewers. Containers of coal tar naphtha may explode in the heat of the fire and should be moved from the fire area if it is possible to do so safely. If this is not possible, cool fire exposed containers from the sides with water until well after the fire is out. Stay away from the ends of containers. Personnel should withdraw

immediately if a rising sound from a venting safety device is heard or if there is discoloration of a container due to fire. Firefighters should wear a full set of protective clothing and self-contained breathing apparatus when fighting fires involving coal tar naphtha.

EXPOSURE LIMITS

* OSHA PEL

The current Occupational Safety and Health Administration (OSHA) permissible exposure limit (PEL) for coal tar naphtha is 100 parts per million (ppm) parts of air (400 milligrams per cubic meter (mg/m³)) as an 8-hour time-weighted average (TWA) concentration [29 CFR 1910.1000, Table Z-1].

* NIOSH REL

The National Institute for Occupational Safety and Health (NIOSH) has established a recommended exposure limit (REL) for coal tar naphtha of 100 ppm (400 mg/m³) as a TWA for up to a 10-hour workday and a 40-hour workweek [NIOSH 1992].

* ACGIH TLV

The American Conference of Governmental Industrial Hygienists (ACGIH) has not assigned coal tar naphtha a threshold limit value.

* Rationale for Limits

The NIOSH limit is based on the risk of narcosis, and liver and kidney damage reported in animals [NIOSH 1992].

HEALTH HAZARD INFORMATION

* Routes of Exposure

Exposure to coal tar naphtha can occur through inhalation, ingestion, and eye or skin contact.

* Summary of toxicology

1. Effects on Animals: Coal tar naphtha is an irritant and has caused damage to the liver, kidneys, and spleen in experimental animals. The dermal LD(50) in rabbits is greater than 3 gm/kg [NIOSH 1991]. The oral LD(50) in rats is greater than 5 gm/kg [NIOSH 1991]. The lowest lethal concentration (LC_{Lo}) reported in rats is 1,600 ppm for 6 hours [NIOSH 1991]. This exposure also resulted in behavioral changes that included somnolence [NIOSH 1991]. Damage to the liver, kidneys, and spleen of experimental animals has been reported, but no further information was available on the exposures causing these effects [NIOSH 1994a; Sittig 1991].

2. Effects on Humans: There are no well documented reports of industrial injury resulting from the inhalation of coal tar naphtha; however, coal tar naphtha is expected to be an irritant of the skin, eyes, and mucous membranes and a central nervous system depressant [Hathaway et al. 1991]. A general discussion of the toxicity of naphthas indicated that exposures to high concentrations would result in central nervous system depression, and that direct contact between the liquid and the skin could result in "chapping" and possibly photosensitivity if contact was repeated [Sittig 1991]. Coal tar naphtha may cause skin irritation due to its defatting action [Hathaway et al. 1991]. Skin burns may also result if the liquid is held in contact with the skin by contaminated clothing [Sittig 1991]. Because of the benzene content of the coal tar naphtha, exposures could be expected to result in blood changes such as leukopenia, aplastic anemia, or leukemia [Sittig 1991]. Cardiovascular system and respiratory system effects are also considered potential responses to exposures to coal tar naphtha

[NLM 1995].

* Signs and symptoms of exposure

1. Acute exposure: No signs or symptoms of acute exposure to coal tar naphtha have been reported in humans.

2. Chronic exposure: No signs or symptoms of chronic exposure to coal tar naphtha have been reported in humans.

EMERGENCY MEDICAL PROCEDURES

* Emergency medical procedures: [NIOSH to supply]

5. Rescue: Remove an incapacitated worker from further exposure and implement appropriate emergency procedures (e.g., those listed on the Material Safety Data Sheet required by OSHA's Hazard Communication Standard [29 CFR 1910.1200]). All workers should be familiar with emergency procedures, the location and proper use of emergency equipment, and methods of protecting themselves during rescue operations.

EXPOSURE SOURCES AND CONTROL METHODS

The following operations may involve coal tar naphtha and lead to worker exposures to this substance:

* The manufacture and transportation of coal tar naphtha

* Use as a solvent

Methods that are effective in controlling worker exposures to coal tar naphtha, depending on the feasibility of implementation, are as follows:

- * Process enclosure
- * Local exhaust ventilation
- * General dilution ventilation
- * Personal protective equipment

Workers responding to a release or potential release of a hazardous substance must be protected as required by paragraph (q) of OSHA's Hazardous Waste Operations and Emergency Response Standard [29 CFR 1910.120].

Good sources of information about control methods are as follows:

1. ACGIH [1992]. Industrial ventilation--a manual of recommended practice. 21st ed. Cincinnati, OH: American Conference of Governmental Industrial Hygienists.
2. Burton DJ [1986]. Industrial ventilation--a self study companion. Cincinnati, OH: American Conference of Governmental Industrial Hygienists.
3. Alden JL, Kane JM [1982]. Design of industrial ventilation systems. New York, NY: Industrial Press, Inc.
4. Wadden RA, Scheff PA [1987]. Engineering design for control of workplace hazards. New York, NY: McGraw-Hill.
5. Plog BA [1988]. Fundamentals of industrial hygiene. Chicago, IL: National Safety Council.

MEDICAL SURVEILLANCE

OSHA is currently developing requirements for medical surveillance. When these

requirements are promulgated, readers should refer to them for additional information and to determine whether employers whose employees are exposed to coal tar naphtha are required to implement medical surveillance procedures.

*** Medical Screening**

Workers who may be exposed to chemical hazards should be monitored in a systematic program of medical surveillance that is intended to prevent occupational injury and disease. The program should include education of employers and workers about work-related hazards, early detection of adverse health effects, and referral of workers for diagnosis and treatment. The occurrence of disease or other work-related adverse health effects should prompt immediate evaluation of primary preventive measures (e.g., industrial hygiene monitoring, engineering controls, and personal protective equipment). A medical surveillance program is intended to supplement, not replace, such measures. To detect and control work-related health effects, medical evaluations should be performed (1) before job placement, (2) periodically during the term of employment, and (3) at the time of job transfer or termination.

*** Preplacement medical evaluation**

Before a worker is placed in a job with a potential for exposure to coal tar naphtha, a licensed health care professional should evaluate and document the worker's baseline health status with thorough medical, environmental, and occupational histories, a physical examination, and physiologic and laboratory tests appropriate for the anticipated occupational risks. These should concentrate on the function and integrity of the eyes, skin, respiratory system, hematopoietic system, central nervous system, liver, and kidneys. Medical surveillance for respiratory disease should be conducted using the principles and methods recommended by the American Thoracic Society.

A preplacement medical evaluation is recommended to assess medical conditions that may be aggravated or may result in increased risk when a worker is exposed to coal tar naphtha at or below the prescribed exposure limit. The health care professional should consider the probable frequency, intensity, and duration of exposure as well as the nature and degree of any applicable medical condition. Such conditions (which should not be regarded as absolute contraindications to job placement) include a history and other findings consistent with diseases of the eyes, skin, respiratory system, hematopoietic system, central nervous system, liver, or kidneys [NIOSH 1994a].

*** Periodic medical evaluations**

Occupational health interviews and physical examinations should be performed at regular intervals during the employment period, as mandated by any applicable Federal, State, or local standard. Where no standard exists and the hazard is minimal, evaluations should be conducted every 3 to 5 years or as frequently as recommended by an experienced occupational health physician. Additional examinations may be necessary if a worker develops symptoms attributable to coal tar naphtha exposure. The interviews, examinations, and medical screening tests should focus on identifying the adverse effects of coal tar naphtha on the eyes, skin, respiratory system, hematopoietic system, central nervous system, liver, or kidneys [NIOSH 1994a]. Current health status should be compared with the baseline health status of the individual worker or with expected values for a suitable reference population.

*** Termination medical evaluations**

The medical, environmental, and occupational history interviews, the physical examination, and selected physiologic or laboratory tests that were conducted at the time of placement should be repeated at the time of job transfer or termination to determine the worker's medical status at the end of his or her employment. Any changes in the worker's health status should be compared with

those expected for a suitable reference population.

* Biological monitoring

Biological monitoring involves sampling and analyzing body tissues or fluids to provide an index of exposure to a toxic substance or metabolite. No biological monitoring test acceptable for routine use has yet been developed for coal tar naphtha.

WORKPLACE MONITORING AND MEASUREMENT

Determination of a worker's exposure to airborne coal tar naphtha is made using a charcoal tube (100/50 mg sections, 20/40 mesh). Samples are collected at a maximum flow rate of 0.2 liter/minute until a maximum collection volume of 20 liters is reached. The sample is then treated with 99:1, carbon disulfide:dimethylformamide. Analysis is conducted by gas chromatography using a flame ionization detector (GC/FID). This method is described in the OSHA Computerized Information System [OSHA 1994] and in NIOSH Method No. 1550 [NIOSH 1994b].

PERSONAL HYGIENE PROCEDURES

If coal tar naphtha contacts the skin, workers should immediately wash the affected areas with large amounts of soap and water, and seek medical attention immediately.

Clothing contaminated with coal tar naphtha should be removed immediately, and provisions should be made for the safe removal of the chemical from the clothing. Persons laundering the clothes should be informed of the hazardous properties of coal tar naphtha, particularly its potential for causing eye, skin, and mucous membrane irritation.

A worker who handles coal tar naphtha should thoroughly wash hands, forearms, and face with soap and water before eating, using tobacco products, using toilet facilities, applying cosmetics, or taking medication.

Workers should not eat, drink, use tobacco products, apply cosmetics, or take medication in areas where coal tar naphtha or a solution containing coal tar naphtha is handled, processed, or stored.

STORAGE

Coal tar naphtha should be stored in a cool, dry, well-ventilated area in tightly sealed containers that are labeled in accordance with OSHA's Hazard Communication Standard [29 CFR 1910.1200]. Containers of coal tar naphtha should be protected from physical damage and ignition sources, and should be stored separately from strong oxidizers such as chlorine and chlorine dioxide.

SPILLS AND LEAKS

In the event of a spill or leak involving coal tar naphtha, persons not wearing protective equipment and clothing should be restricted from contaminated areas until cleanup has been completed. The following steps should be undertaken following a spill or leak:

1. Do not touch the spilled material; stop the leak if it is possible to do so without risk.
2. Notify safety personnel.
3. Remove all sources of heat and ignition.
4. Ventilate the area of the spill or leak.
5. Water spray may be used to reduce vapors, but the spray may not prevent ignition in

closed spaces.

6. For small spills, take up with sand or other noncombustible absorbent material and place into closed containers for later disposal.

7. For large liquid spills, build dikes far ahead of the spill to contain the coal tar naphtha for later reclamation or disposal.

SPECIAL REQUIREMENTS

U.S. Environmental Protection Agency (EPA) requirements for emergency planning, reportable quantities of hazardous releases, community right-to-know, and hazardous waste management may change over time. Users are therefore advised to determine periodically whether new information is available.

*** Emergency planning requirements**

Coal tar naphtha is not subject to EPA emergency planning requirements under the Superfund Amendments and Reauthorization Act (SARA) (Title III) in 42 USC 11022.

*** Reportable quantity requirements for hazardous releases**

A hazardous substance release is defined by EPA as any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment (including the abandonment or discarding of contaminated containers) of hazardous substances. In the event of a release that is above the reportable quantity for that chemical, employers are required to notify the proper Federal, State, and local authorities [40 CFR 355.40].

Employers are not required by the emergency release notification provisions in 40 CFR Part 355.40 to notify the National Response Center of an accidental release of coal tar naphtha; there is no reportable quantity for this substance.

*** Community right-to-know requirements**

Employers are not required by EPA in 40 CFR Part 372.30 to submit a Toxic Chemical Release Inventory form (Form R) to EPA reporting the amount of coal tar naphtha emitted or released from their facility annually.

*** Hazardous waste management requirements**

EPA considers a waste to be hazardous if it exhibits any of the following characteristics: ignitability, corrosivity, reactivity, or toxicity as defined in 40 CFR 261.21-261.24. Under the Resource Conservation and Recovery Act (RCRA) [40 USC 6901 et seq.], EPA has specifically listed many chemical wastes as hazardous. Although coal tar naphtha is not specifically listed as a hazardous waste under RCRA, EPA requires employers to treat waste as hazardous if it exhibits any of the characteristics discussed above.

Providing detailed information about the removal and disposal of specific chemicals is beyond the scope of this guideline. The U.S. Department of Transportation, EPA, and State and local regulations should be followed to ensure that removal, transport, and disposal of this substance are conducted in accordance with existing regulations. To be certain that chemical waste disposal meets EPA regulatory requirements, employers should address any questions to the RCRA hotline at (703) 412-9810 (in the Washington, D.C. area) or toll-free at (800) 424-9346 (outside Washington, D.C.). In addition, relevant State and local authorities should be contacted for information on any requirements they may have for the waste removal and disposal of this substance.

RESPIRATORY PROTECTION*** Conditions for respirator use**

Good industrial hygiene practice requires that engineering controls be used where feasible to reduce workplace concentrations of hazardous materials to the prescribed exposure limit. However, some situations may require the use of respirators to control exposure. Respirators must be worn if the ambient concentration of coal tar naphtha exceeds prescribed exposure limits. Respirators may be used (1) before engineering controls have been installed, (2) during work operations such as maintenance or repair activities that involve unknown exposures, (3) during operations that require entry into tanks or closed vessels, and (4) during emergencies. Workers should only use respirators that have been approved by NIOSH and the Mine Safety and Health Administration (MSHA).

*** Respiratory protection program**

Employers should institute a complete respiratory protection program that, at a minimum, complies with the requirements of OSHA's Respiratory Protection Standard [29 CFR 1910.134]. Such a program must include respirator selection, an evaluation of the worker's ability to perform the work while wearing a respirator, the regular training of personnel, respirator fit testing, periodic workplace monitoring, and regular respirator maintenance, inspection, and cleaning. The implementation of an adequate respiratory protection program (including selection of the correct respirator) requires that a knowledgeable person be in charge of the program and that the program be evaluated regularly. For additional information on the selection and use of respirators and on the medical screening of respirator users, consult the latest edition of the NIOSH Respirator Decision Logic [NIOSH 1987b] and the NIOSH Guide to Industrial Respiratory Protection [NIOSH 1987a].

PERSONAL PROTECTIVE EQUIPMENT

Workers should use appropriate personal protective clothing and equipment that must be carefully selected, used, and maintained to be effective in preventing skin contact with coal tar naphtha. The selection of the appropriate personal protective equipment (PPE) (e.g., gloves, sleeves, encapsulating suits) should be based on the extent of the worker's potential exposure to coal tar naphtha. The resistance of various materials to permeation by naphthas of less than 20 percent aromatics (coal tar naphtha) is shown below:

Material	Breakthrough time (hr)
nitrile rubber	>8
viton	>8
saranex	>8
4H (PE/EVAL)	>8
barricade	>8
polyvinyl alcohol	>4
neoprene	Caution 1 to 4
butyl rubber	<1(*)
natural rubber	<1(*)

(*) Not recommended, degradation may occur

To evaluate the use of these materials with coal tar naphtha, users should consult the best available performance data and manufacturers' recommendations. Significant differences have been demonstrated in the chemical resistance of generically similar PPE materials (e.g., butyl) produced by different manufacturers. In addition, the chemical resistance of a mixture may be significantly different from that of any of its

neat components.

Any chemical-resistant clothing that is used should be periodically evaluated to determine its effectiveness in preventing dermal contact. Safety showers and eye wash stations should be located close to operations that involve coal tar naphtha.

Splash-proof chemical safety goggles or face shields (20 to 30 cm long, minimum) should be worn during any operation in which a solvent, caustic, or other toxic substance may be splashed into the eyes.

In addition to the possible need for wearing protective outer apparel (e.g., aprons, encapsulating suits), workers should wear work uniforms, coveralls, or similar full-body coverings that are laundered each day. Employers should provide lockers or other closed areas to store work and street clothing separately. Employers should collect work clothing at the end of each work shift and provide for its laundering. Laundry personnel should be informed about the potential hazards of handling contaminated clothing and instructed about measures to minimize their health risk.

Protective clothing should be kept free of oil and grease and should be inspected and maintained regularly to preserve its effectiveness.

Protective clothing may interfere with the body's heat dissipation, especially during hot weather or during work in hot or poorly ventilated work environments.

REFERENCES

ATS [1987]. Standardization of spirometry -- 1987 update. American Thoracic Society. *Am Rev Respir Dis* **136**:1285-1296.

CFR. Code of Federal regulations. Washington, DC: U.S. Government Printing Office, Office of the Federal Register.

DOT [1993]. 1993 Emergency response guidebook, guide 27. Washington, DC: U.S. Department of Transportation, Office of Hazardous Materials Transportation, Research and Special Programs Administration.

Forsberg K, Mansdorf SZ [1993]. Quick selection guide to chemical protective clothing. New York, NY: Van Nostrand Reinhold.

Hathaway GJ, Proctor NH, Hughes JP, and Fischman ML [1991]. Proctor and Hughes' chemical hazards of the workplace. 3rd ed. New York, NY: Van Nostrand Reinhold.

Mickelsen RL, Hall RC [1987]. A breakthrough time comparison of nitrile and neoprene glove materials produced by different glove manufacturers. *Am Ind Hyg Assoc J* **48** (11): 941-947.

Mickelsen RL, Hall RC, Chern RT, Myers JR [1991]. Evaluation of a simple weight-loss method for determining the permeation of organic liquids through rubber films. *Am Ind Hyg Assoc J* **52**(10): 445-447.

NFPA [1986]. Fire protection guide on hazardous materials. 9th ed. Quincy, MA: National Fire Protection Association.

NIOSH [1987a]. NIOSH guide to industrial respiratory protection. Cincinnati, OH: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, National Institute for Occupational Safety and Health, DHHS (NIOSH) Publication No. 87-116.

NIOSH [1987b]. NIOSH respirator decision logic. Cincinnati, OH: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, National Institute for Occupational Safety and Health, DHHS (NIOSH) Publication No.

87-108.

NIOSH [1991]. Registry of toxic effects of chemical substances: Coal tar naphtha. Cincinnati, OH: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, National Institute

for Occupational Safety and Health, Division of Standards Development and Technology Transfer, Technical Information Branch.

NIOSH [1992]. Recommendations for occupational safety and health: Compendium of policy documents and statements. Cincinnati, OH: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, National Institute for Occupational Safety and Health, DHHS (NIOSH) Publication No. 92-100.

NIOSH [1994a]. NIOSH pocket guide to chemical hazards. Cincinnati, OH: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, National Institute for Occupational Safety and Health, DHHS (NIOSH) Publication No. 94-116.

NIOSH [1994b]. NIOSH manual of analytical methods. 4th ed. Cincinnati, OH: U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, National Institute for Occupational Safety and Health, DHHS (NIOSH) Publication No. 94-113.

NJDH [1986]. Hazardous substance fact sheet: Coal tar naphtha. Trenton, NJ: New Jersey Department of Health.

NLM [1995]. Hazardous substances data bank: Coal tar naphtha. Bethesda, MD: National Library of Medicine.

OSHA [1994]. Computerized information system. Washington, DC: U.S. Department of Labor, Occupational Safety and Health Administration.


Sax NI, Lewis RJ [1989]. Dangerous properties of industrial materials. 7th ed. New York, NY: Van Nostrand Reinhold Company.

Sittig M [1991]. Handbook of toxic and hazardous chemicals. 3rd ed. Park Ridge, NJ: Noyes Publications.

USC. United States code. Washington. DC: U.S. Government Printing Office.

USCG [1984]. CHRIS (chemical hazards response information system) hazardous chemical data manual: coal tar naphtha. Washington, DC: U.S. Department of Transportation, U.S. Coast Guard, Commandant Instruction M16465.12A.

Windholz M, ed. [1983]. Merck Index 10th ed. Rahway, NJ: Merck & Company.

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